REMARKS

Reconsideration of this application and entry of this Response is respectfully requested.

The rejection of claim 1 under the second paragraph of 35 USC §112 as being indefinite is respectfully traversed. The basis for this rejection appears to be the use of the term "depth model" in step (b) of claim 1. The term "depth model" is well known to those skilled in the art to whom this invention is directed, that is, geophysicists that work in seismic technology. Thus, the term "depth model" refers simply to a computer model of the earth based on reflector data, seismic velocities, and other appropriate parameters. The term "depth model" is interchangeable with "earth model" and each term has the same meaning.

The examiner's attention is invited to the application at page 4, line 11 wherein further information regarding the "depth model" appears in references 2, 5, 6 and 7. The equivalent term "earth model" is used in the *Tygel et al* reference relied upon by the examiner, for example, on page 1820, last line in the right hand column; page 1821 in the first line of the text below Figure 1; page 1825 in the descriptive material and below Figure 4 left hand column. Therefore, the term "depth model" is not indefinite because its meaning and the manner in which it is established is well known to those skilled in the art.

If the examiner prefers, applicant is willing to amend claims 1 and 7 to restore the language "earth model". However, please note that the term "depth model" appears as part of the original text of claim 1 (d) and in claim 7 (d).

The rejection of claims 1, 7 and 13-29 under 35 USC §102 (b) as being anticipated by *Tygel et al* is respectfully traversed. It is well known that to anticipate under 35 U.S.C. § 102 a prior art reference must disclose each and every element of the claimed invention. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990); *Atlas Powder Company v. E.I. DuPont de Nemours & Company*, 224 USPQ 409 (Fed. Cir. 1984).

It is respectfully submitted that applicant's claimed invention is not anticipated by *Tygel et al* which does not disclose each and every element of applicant's claimed invention.

Claim 1 recites a method for finding the reflection coefficient of reflectors in the subsurface of the ground. Claim 7 recites an article of manufacture comprising a computer useable medium having computer readable program code embodied therein for finding the reflection coefficient of reflectors in the subsurface. Claim 23 recites a data set representing the reflection coefficient of subsurface reflectors. The corresponding steps of each of these claims are similar and related.

The distinctions between the claimed invention and *Tygel et al* are as follows:

1. Step (b) of claims 1, 7 and 23 recites that $P_{Obs}(\bar{x})$ is interpreted so that the special positions of the reflectors in the subsurface are found. Based on these reflectors and the seismic velocities used in the PSDM in step (a) a computerized depth model is constructed. One of the surfaces in the model is chosen as a target reflector. In contrast, in *Tygel et al*, the positions of explicit reflectors are not found by interpretation, but rather by finding points M=R that give finite values of c(M) in equation 5. This is a fundamental difference between the claimed invention and *Tygel et al*. See page 1822 of *Tygel et al*.

2. Steps (c) and (d) of claims 1, 7 and 23 deal with the computation of synthetic traces from the target reflector for all shot/receiver pairs. The reflection coefficient of the target reflector is then set in the depth model to an essentially constant value when the synthetic traces are computed. This approach takes into account the curvature of the reflector in a dynamic manner. In contrast, *Tygel* calculates the ray from the source positions on the surface to a specular reflection point M=R in the subsurface found in (b). The ray is then traced from the point M=R to the receiver.

3. Step (e) of claim 1, 7 and 23 uses a dynamic approach to perform a pre-stacked depth migration of the traces produced from the ray tracing using a two way travel time approximation computed by the ray tracing. The ray tracing tracers are then computed setting the reflection coefficient of the target reflector to unity. The source pulse or another suitable pulse is then used in generating the ray tracing traces. In contrast, *Tygel et al* derives weight factors under the assumption of a stationary phase as in equation B3 in Appendix B on page 1830. The dynamic approach of the claimed invention is in contrast to the static approach of *Tygel et al* which is also a fundamental difference between applicant's claimed invention and *Tygel et al*.

4. Step (f) of claims 1, 7 and 23 measure the amplitudes along the target reflector from the real PSDM cube. These measurements are divided by the corresponding measurements of the model PSDM cube to obtain an estimate of the angle dependent reflection coefficient with corresponding reflection angle and weight function. In contrast, *Tygel et al* corrects the migration result V_1 (see page 1824 in *Tygel et al*) in the reflection point R with the weight derived from the weight factors already discussed in the previous step.

In applicant's claimed invention, the reflection angle is found corresponding to the estimate of the reflection coefficient by taking the weighted average of all rays contributing to each estimate along the reflector. In contrast, *Tygel et al* finds the reflection angle corresponding to the corrected amplitude point found in point R by using the reflection angle of the specular ray.

Thus, the examiner's interpretation of *Tygel et al* in relation to the claimed invention does not appear to have considered each and every element and the significant distinctions between the claimed invention and *Tygel et al*. Accordingly, since *Tygel et al* does not disclose each and every element of the claimed invention, the rejection under 35 USC §102 should be reconsidered and withdrawn. Furthermore, it is also respectfully submitted that there is no obvious basis in *Tygel et al* which would suggest the claimed invention in accordance with the requirements of 35 USC §103.

With regard to the examiner's discussion of *Tygel et al* in relation to the remaining claims 13 to 22 and 24 to 29, each of which is dependent upon either claim 1, 7 and 23, it is respectfully submitted that such dependent claims are also allowable, as being dependent on allowable independent claims 1, 7 and 23.

Lastly, applicant has also considered the *deBruin et al* reference, made of record by the examiner. Inasmuch as this reference has not been cited against the claims and does not appear relevant thereto, a detailed discussion of this reference shall not appear herein.

In view of the above arguments, it is respectfully submitted that this application is now in condition for allowance and such favorable action is respectfully requested.

Respectfully submitted,

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